

WHAT IS CLAIMED IS:

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1. A method for optically recording
information on an optically re-writable information
medium having at least one track in which method a
laser light is focused to a laser spot to form a
10 mark on said optically re-writable information
medium and a size of said mark is modulated
according to a level of a multi-level signal that
corresponds to said information to be recorded, in
said method:

15 a strength of said laser light for
recording each mark is modulated according to a
waveform comprising a first rectangular erasing
pulse signal, a rectangular recording pulse signal,
an off-pulse signal and a second rectangular erasing
20 pulse signal,

said laser light having a strength set to
a value indicated by said first rectangular erasing
pulse signal can erase a recorded mark,

said laser light having a strength set to
25 a value indicated by said rectangular recording

pulse signal can record a mark,

a strength of said laser light set to a value indicated by said off-pulse signal is less than a strength of said laser light used in

5 reproduction of said recorded marks,

said laser light having a strength set to a value indicated by said second rectangular erasing pulse signal can erase said recorded mark, and

a product of the time interval of said
10 rectangular recording pulse signal and a relative linear velocity between said laser spot and said optically re-writable information medium is shorter than a length of said recorded mark.

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2. A method for optically recording information on an optically re-writable information
20 medium as claimed in claim 1, wherein a size of said mark is modulated according to said information by means of modulating a pulse width of said off-pulse signal so that a time interval between a rising edge of said rectangular recording pulse signal and a
25 rising edge of said rectangular erasing pulse signal

corresponds to said size of said mark.

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3. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 1, wherein said track is
divided into a plurality of cells and said mark is
10 recorded in said cell so that a center of said mark
is placed at a center of said cell by means of
adjusting both a rising edge of said rectangular
recording pulse signal and a rising edge of said
rectangular erasing pulse signal.

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4. A method for optically recording
20 information on an optically re-writable information
medium as claimed in claim 2, wherein said track is
divided into a plurality of cells and said mark is
recorded in said cell so that a center of said mark
is placed at a center of said cell by means of
25 adjusting both said rising edge of said rectangular

recording pulse signal and said rising edge of said rectangular erasing pulse signal.

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5. A method for optically recording information on an optically re-writable information medium as claimed in claim 1, wherein said size of
10 said mark is fine-adjusted by controlling timing of a falling edge of said rectangular recording pulse signal.

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6. A method for optically recording information on an optically re-writable information medium as claimed in claim 2, wherein said size of
20 said mark is fine-adjusted by controlling timing of a falling edge of said rectangular recording pulse signal.

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7. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 3, wherein said size of
5 said mark is fine-adjusted by controlling timing of
a falling edge of said rectangular recording pulse
signal.

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8. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 4, wherein said size of
15 said mark is fine-adjusted by controlling timing of
a falling edge of said rectangular recording pulse
signal.

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9. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 1, wherein said size of
25 said mark is fine-adjusted by controlling said

strength of said laser light modulated by said rectangular recording pulse signal.

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10. A method for optically recording information on an optically re-writable information medium as claimed in claim 2, wherein said size of
10 said mark is fine-adjusted by controlling said strength of said laser light modulated by said rectangular recording pulse signal.

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11. A method for optically recording information on an optically re-writable information medium as claimed in claim 3 , wherein said size of
20 said mark is fine-adjusted by controlling said strength of said laser light modulated by said rectangular recording pulse signal.

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12. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 4, wherein said size of
5 said mark is fine-adjusted by controlling said
strength of said laser light modulated by said
rectangular recording pulse signal.

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13. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 5, wherein timing of a
15 rising edge of said rectangular recording pulse
signal is controlled so that a center of said mark
is placed at a center of said cell.

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14. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 6, wherein timing of a
25 rising edge of said rectangular recording pulse

signal is controlled so that a center of said mark is placed at a center of said cell.

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15. A method for optically recording information on an optically re-writable information medium as claimed in claim 7, wherein timing of a
10 rising edge of said rectangular recording pulse signal is controlled so that a center of said mark is placed at a center of said cell.

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16. A method for optically recording information on an optically re-writable information medium as claimed in claim 8, wherein timing of a
20 rising edge of said rectangular recording pulse signal is controlled so that a center of said mark is placed at a center of said cell.

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17. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 9, wherein timing of a
5 rising edge of said rectangular recording pulse
signal is controlled so that a center of said mark
is placed at a center of said cell.

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18. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 10, wherein timing of a
15 rising edge of said rectangular recording pulse
signal is controlled so that a center of said mark
is placed at a center of said cell.

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19. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 11, wherein timing of a
25 rising edge of said rectangular recording pulse

signal is controlled so that a center of said mark is placed at a center of said cell.

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20. A method for optically recording information on an optically re-writable information medium as claimed in claim 12, wherein timing of a rising edge of said rectangular recording pulse signal is controlled so that a center of said mark is placed at a center of said cell.

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21. A method for optically recording information on an optically re-writable information medium as claimed in claim 1, wherein a relation between said length (ML) of said mark along said track and a diameter (BD) of said laser spot satisfies $ML \leq BD$, and

a product of said pulse width of said rectangular recording pulse signal and said relative linear velocity is less than 20 % of said diameter

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(BD) of said laser spot.

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22. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 2, wherein a relation
between said length (ML) of said mark along said
10 track and a diameter (BD) of said laser spot
satisfies $ML \leq BD$, and

a product of said pulse width of said
rectangular recording pulse signal and said relative
linear velocity is less than 20 % of said diameter
15 (BD) of said laser spot.

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23. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 3, wherein a relation
between said length (ML) of said mark along said
track and a diameter (BD) of said laser spot
25 satisfies $ML \leq BD$, and

a product of said pulse width of said rectangular recording pulse signal and said relative linear velocity is less than 20 % of said diameter (BD) of said laser spot.

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24. A method for optically recording
10 information on an optically re-writable information medium as claimed in claim 5, wherein a relation between said length (ML) of said mark along said track and a diameter (BD) of said laser spot satisfies $ML \leq BD$, and

15 a product of said pulse width of said rectangular recording pulse signal and said relative linear velocity is less than 20 % of said diameter (BD) of said laser spot.

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25. A method for optically recording
information on an optically re-writable information
25 medium as claimed in claim 9, wherein a relation

between said length (ML) of said mark along said track and a diameter (BD) of said laser spot satisfies $ML \leq BD$, and

5 a product of said pulse width of said rectangular recording pulse signal and said relative linear velocity is less than 20 % of said diameter (BD) of said laser spot.

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26. A method for optically recording information on an optically re-writable information medium as claimed in claim 13, wherein a relation
15 between said length (ML) of said mark along said track and a diameter (BD) of said laser spot satisfies $ML \leq BD$, and

a product of said pulse width of said rectangular recording pulse signal and said relative
20 linear velocity is less than 20 % of said diameter (BD) of said laser spot.

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27. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 1, wherein a relation
between a length of a minimum mark (MLmin) along
5 said track except when there is no mark and a
diameter (BD) of said laser spot satisfies $MLmin /$
 $BD \geq 0.10$, and

each level of said multi-level signal is
assigned so that the level difference between
10 adjacent levels becomes equidistant except when
there is no mark.

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28. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 2, wherein a relation
between a length of a minimum mark (MLmin) along
20 said track except when there is no mark and a
diameter (BD) of said laser spot satisfies $MLmin /$
 $BD \geq 0.10$, and

each level of said multi-level signal is
assigned so that the level difference between
25 adjacent levels becomes equidistant except when

there is no mark.

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29. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 3, wherein a relation
between a length of a minimum mark (MLmin) along
10 said track except when there is no mark and a
diameter (BD) of said laser spot satisfies $MLmin /$
BD ≥ 0.10 , and

each level of said multi-level signal is
assigned so that the level difference between
15 adjacent levels becomes equidistant except when
there is no mark.

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30. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 5, wherein a relation
between a length of a minimum mark (MLmin) along
25 said track except when there is no mark and a

diameter (BD) of said laser spot satisfies $ML_{min} / BD \geq 0.10$, and

each level of said multi-level signal is assigned so that the level difference between adjacent levels becomes equidistant except when there is no mark.

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31. A method for optically recording information on an optically re-writable information medium as claimed in claim 9, wherein a relation between a length of a minimum mark (ML_{min}) along said track except when there is no mark and a diameter (BD) of said laser spot satisfies $ML_{min} / BD \geq 0.10$, and

each level of said multi-level signal is assigned so that the level difference between adjacent levels becomes equidistant except when there is no mark.

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32. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 13, wherein a relation
between a length of a minimum mark (MLmin) along
5 said track except when there is no mark and a
diameter (BD) of said laser spot satisfies $MLmin /$
 $BD \geq 0.10$, and

each level of said multi-level signal is
assigned so that the level difference between
10 adjacent levels becomes equidistant except when
there is no mark.

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33. A method for optically recording
information on an optically re-writable information
medium as claimed in claim 1, wherein
a relation between a length of a maximum
20 mark (MLmax) along said track, except for a mark
that has about the same length as a diameter of said
laser spot, and a diameter (BD) of said laser spot
satisfies $MLmax / BD \leq 0.70$, and

each occupied mark ratio of said multi-
25 level signal is assigned so that the difference

between said occupied mark ratios corresponding to adjacent levels of said multi-level signal becomes equidistant except for said mark that has about the same length as said diameter of said laser spot.

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34. A method for optically recording
10 information on an optically re-writable information medium as claimed in claim 2, wherein

a relation between a length of a maximum mark (MLmax) along said track, except for a mark that has about the same length as a diameter of said
15 laser spot, and a diameter (BD) of said laser spot satisfies $ML_{max} / BD \leq 0.70$, and

each occupied mark ratio of said multi-level signal is assigned so that the difference between said occupied mark ratios corresponding to
20 adjacent levels of said multi-level signal becomes equidistant except for said mark that has about the same length as said diameter of said laser spot.

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35. A method for optically recording information on an optically re-writable information medium as claimed in claim 3, wherein

5 a relation between a length of a maximum mark (MLmax) along said track, except for a mark that has about the same length as a diameter of said laser spot, and a diameter (BD) of said laser spot satisfies $ML_{max} / BD \leq 0.70$, and

10 each occupied mark ratio of said multi-level signal is assigned so that the difference between said occupied mark ratios corresponding to adjacent levels of said multi-level signal becomes equidistant except for said mark that has about the

15 same length as said diameter of said laser spot.

20 36. A method for optically recording information on an optically re-writable information medium as claimed in claim 5, wherein

a relation between a length of a maximum mark (MLmax) along said track, except for a mark

25 that has about the same length as a diameter of said

laser spot, and a diameter (BD) of said laser spot satisfies $ML_{max} / BD \leq 0.70$, and

each occupied mark ratio of said multi-level signal is assigned so that the difference
5 between said occupied mark ratios corresponding to adjacent levels of said multi-level signal becomes equidistant except for said mark that has about the same length as said diameter of said laser spot.

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37. A method for optically recording information on an optically re-writable information
15 medium as claimed in claim 9, wherein

a relation between a length of a maximum mark (ML_{max}) along said track, except for a mark that has about the same length as a diameter of said laser spot, and a diameter (BD) of said laser spot
20 satisfies $ML_{max} / BD \leq 0.70$, and

each occupied mark ratio of said multi-level signal is assigned so that the difference between said occupied mark ratios corresponding to adjacent levels of said multi-level signal becomes
25 equidistant except for said mark that has about the

same length as said diameter of said laser spot.

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38. A method for optically recording information on an optically re-writable information medium as claimed in claim 13, wherein

a relation between a length of a maximum
10 mark (MLmax) along said track, except for a mark that has about the same length as a diameter of said laser spot, and a diameter (BD) of said laser spot satisfies $ML_{max} / BD \leq 0.70$, and

each occupied mark ratio of said multi-
15 level signal is assigned so that the difference between said occupied mark ratios corresponding to adjacent levels of said multi-level signal becomes equidistant except for said mark that has about the same length as said diameter of said laser spot.

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